

Cocaine addiction is associated with impaired learning on the Wisconsin Card Sort Task: findings in high functioning individuals

¹D. Delosh, ¹A.C. Leskovjan, ¹L.A.Cottone, ¹N. Alia-Klein, ¹G.J. Wang, ¹J. S. Fowler,

²N.D. Volkow and ¹R.Z. Goldstein

¹Brookhaven National Laboratory, Upton, NY

²National Institute of Health /National Institute of Drug Addiction. Bethesda, MD

The Wisconsin Card Sort Task (WCST) assesses perseverations, the uncontrollable repetition of a particular response despite a change in reward contingencies, characteristic of prefrontal dysfunction. Previous studies highlighted the clinical importance of executive dysfunction in addiction; however, studies employing the WCST in human cocaine addiction yielded inconclusive results. In this study, we divided 134 subjects into four groups based on drug use history and WCST performance: substance dependent individuals (SDI) who completed less than six categories on the WCST (SDI<6, N=28), SDIs who completed all six categories (SDI=6, N=24), and the respective control groups (NML<6, N=14; NML=6, N=68). In contrast to the SDI=6, the SDI<6 differed from the NML=6 group on most WCST and demographic variables (e.g., worse performance, less education, etc.). In order to explore possible underlying deficits even in the high functioning SDI group, we compared performance between the matched SDI=6 and NML=6 groups (N=21 in each), while controlling for depression in all further analyses. There was a significant interaction between category and diagnosis [$F(1,38)=5.14$, $p<0.05$] for total cards to complete a WCST category, which was also inversely correlated with percent correct on the Eckman task in all subjects ($r = -0.36$, $p < 0.05$). These findings suggest that cocaine addiction is associated with impaired executive functioning as measured by the WCST, even in a subgroup of subjects otherwise indistinguishable from controls. Further, we speculate that these impairments are primarily related to the functioning of the orbitofrontal cortex.